REMARKS

Claim Rejections Under 35 U.S.C. Section 112

Examiner rejected claims 2-6 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Pursuant to Examiner's recommendation, Applicant amended claims 2-6 to recite the limitation "receiver", which has an antecedent basis in claim 1, instead of "system", which does not have an antecedent basis in claim 1.

Claim Rejections Under 35 U.S.C. Section 102

Examiner rejected claims 1-14 as being anticipated by U.S. Patent No. 6,304,551 (Ramamurthy). In doing so, Examiner has taken the position that Ramamurthy discloses each of the limitations in the pending claims. Below, Applicant addresses Examiner's position and the bases underlying Applicant's respectful disagreement with Examiner's interpretation of the Ramamurthy reference.

As a threshold matter, underlying Examiner's interpretation of the Ramamurthy reference is an apparent confusion over a) how the cell stream traffic is characterized and b) precisely what is being subject to "real-time estimation". Ramamurthy operates by receiving a cell stream from a source, characterizing the cell stream, and, based on that characterization, developing a set of usage parameter control (UPC) values. The UPC values are derived by minimizing a cost function subject to predetermined constraints.

In the first step of receiving and characterizing a cell stream, Ramamurthy discloses the use of peak and mean rates of the cell stream transfer to calculate optimum UPC values by (Col.7:24-52):

(a) offering the traffic stream to a bank of N constant service rate queues with spaced rates that are spaced between an estimated mean rate λ_m and an estimated peak rate λ_p where the spaced rates are candidates for sustainable rates (these are not delays; rather these are merely the estimated mean and peak rates of transmission);

(b) approximating a tail waiting time distribution for each of the queues using a constant service rate and one of the candidate sustainable rates (again, this is not a transmission delay; rather, this is merely the waiting time in the traffic shaper); and

(c) estimating parameters from the equations associated with the above steps.

Once the cell stream is characterized using the mean and peak transmission rates and the associated variables are calculated, the UPC values are obtained via a mapping step. That mapping step:

(a) computes, for each of the candidate sustainable rates used in the characterizing step, a corresponding value for a smallest sustainable bucket size such that a sustainable rate leaky bucket satisfies a constraint which bounds one of a cell violation probability and a mean shaping delay (again this is a delay imposed by the traffic shaper, not created by virtue of transmission from the source to the traffic shaper);

(b) computing, for each of the candidate sustainable rates used in the characterizing step, a corresponding value of the cost function that determines cost to the network;

(c) selecting, among the candidate sustainable rates, an optimal sustainable rate that minimizes the cost function; and

(d) choosing new UPC values that include the peak rate, the optimal sustainable rate, and the sustainable bucket size.

Ramamurthy is not attempting to account for, or calculate variables based upon, a delay experienced by data packets in transmission. On the contrary, it is doing precisely the opposite—calculating what delay to impose on data in order to achieve specific transmission rates and abide by particular UPC values. The "real-time estimation" is not directed toward the real-time estimation of delays experienced by data packets and the real-time accounting for such delays. Rather, the Ramamurthy system has the ability to characterize traffic streams and, as they change (i.e. transmission rates change), perform a real-time estimation of new traffic shaping parameters and negotiate those parameters with a network provider. Again, the real-time estimation has ***no relationship*** with the measurement or calculation of delays experienced by data packets.

Examiners' confusion is highlighted by his frequent reference to certain portions of Ramamurthy that allegedly disclose the calculation and use of mean cell delays or delay jitter.

However, those sections merely support Applicant's argument—that Ramamurthy's invention is completely different from Applicant's. For example, Figures 6 and 7 do not demonstrate the use of mean cell delays in a manner similar to Applicant's invention. On the contrary, those figures are merely used to demonstrate how close Ramamurthy's theoretical calculations approximate real-life mean delays which are imposed upon the cell stream ***by the traffic shaper***. None of the mean cell delay data is disclosed as being used by the Ramamurthy system to estimate playout times and, by definition, they can't be. These mean cell delays are ***created by*** the traffic shaping system and, therefore, can't be simultaneously used by the system to determine how to shape the incoming traffic. See Col.15:27-41.

Similarly, Ramamurthy discloses a theoretical calculation of delay jitter in order to demonstrate where, in the range of operational service rates, one should operate. After Ramamurthy engages in an analysis of the appropriate modeling of delay jitter, he notes that "delay should be more highly variable as the service rate μ approaches the mean rate. This suggests that, in general, the region of rates near the mean should be avoided." Col.12:1-20. Ramamurthy is providing instructions on what service rate should be selected in order to minimize delay jitter, which is in line with the fact that his system shapes the traffic, and is not subjected to it.

Finally, nowhere does Ramamurthy disclose the use of data packet delay histograms, mean delay data, or variances thereof to calculate the bucket size. Examiner's insistence that the specification somehow inherently discloses the measurement of, and use of, the actual delay experienced by data packets in transmission from a transmitter to a receiver is completely at odds with the express protocol for characterizing the cell stream traffic and calculation of the UPC values, none of which includes, or is dependent upon, actual packet delays of any kind. The modeling of a cell stream using a peak or mean transfer rate is completely different from measuring delays experienced by packets during transmission and using those delays to smooth jitter.

Moreover, it would make no sense for Ramamurthy to be concerned with such delays. His system focused on how to impose delays on traffic in order to have them meet certain UPC performance values. To determine those delays, he first characterizes the traffic stream based on

their transmission rates, not packet data delays, which are often outside the control of the system. See, e.g., Col.14:11-28 and Col.5:60-Col.6:5. Using that characterization, the Ramamurthy system performs a real-time estimation and negotiation of UPC values which are used to proactively shape a stream in order to achieve certain QoS objectives, as constrained by certain cost parameters.

Consequently, Examiner's assertions that Ramamurthy discloses the present invention are simply incorrect. Taking a representative set of limitations present in the pending claims:

- A counter for determining delays experienced by data packets in transmission from a transmitter to a receiver. Ramamurthy does not disclose it and does not inherently need it. It characterizes traffic based on mean and peak transmission rates. It need not know or calculate the delays experienced by data packets in transmission from the source to the traffic shaper. Nowhere does Ramamurthy disclose the need to include transmission delays in the characterization of the cell stream traffic or calculation of the UPC values.
- A delay estimator adapted to estimate data indicative of an adaptive packet delay histogram, having a mean, wherein the data indicative of the packet delay histogram is a function of the delays experienced by data packets in transmission from the transmitter to the receiver and the number of data packets received at the receiver. Ramamurthy does not disclose it and does not inherently need it. It characterizes traffic based on mean and peak transmission rates. The determination of the UPC values does not include or depend upon the delays experienced by data packets in transmission from the source to the traffic shaper and, therefore, no adaptive packet delay histogram is used in the characterization of the cell stream traffic or calculation of the UPC values.
- A playout delay evaluator in data communication with the delay estimator and adapted to receive data from the delay estimator, wherein the playout delay evaluator calculates a playout time, and wherein the calculation of the playout time utilizes the mean and a first variance derived from a portion of data indicative of the packet delay histogram. While Ramamurthy's traffic shaper does

evaluate a playout delay and impose some delay on the playout, it does not do so based upon a mean or first variance derived from a portion of the packet delay histogram, as discussed above.

- Measuring delays experienced by data packets in transmission from said transmitter to said receiver. Ramamurthy does not disclose it and does not inherently do it. It characterizes traffic based on mean and peak transmission rates. It need not know or calculate the delays experienced by data packets in transmission from the source to the traffic shaper. Nowhere does Ramamurthy disclose the need to include transmission delays in the characterization of the cell stream traffic or calculation of the UPC values.
- Estimating a mean delay using data indicative of a packet delay histogram, wherein data indicative of said packet delay histogram is a function of the delays experienced by data packets in transmission from the transmitter to the receiver and the number of data packets received at the receiver. Ramamurthy does not disclose it and does not inherently do it. It characterizes traffic based on mean and peak transmission rates. The determination of the UPC values does not include or depend upon the delays experienced by data packets in transmission from the source to the traffic shaper and, therefore, no packet delay histogram is used in the characterization of the cell stream traffic or calculation of the UPC values.
- Deriving a first variance or second variance from data indicative of a histogram or portions thereof. As discussed above, Ramamurthy does not disclose it and does not inherently need it. The determination of the UPC values does not include or depend upon the delays experienced by data packets in transmission from the source to the traffic shaper and, therefore, no packet delay histogram is used in the characterization of the cell stream traffic or calculation of the UPC values.
- Setting a delay equal to a function of the mean delay and the first variance and setting a buffer size equal to a function of the first and second variance. Again, Ramamurthy does not disclose it and does not inherently need it. The determination of the UPC values does not include or depend upon the delays

experienced by data packets in transmission from the source to the traffic shaper and, therefore, no packet delay histogram is used in the characterization of the cell stream traffic or calculation of the UPC values.

In sum, **none** of Ramamurthy's cell stream traffic characterization steps, UPC value mapping steps, and renegotiation of UPC parameters with network providers steps use, are dependent upon, or otherwise employ data derived from delays experienced by data packets transmitted from the source to the Ramamurthy system.